ASTER INSTRUMENT OPERATIONS OVERVIEW

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The Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) is a high spatial resolution multispectral imaging radiometer, and spectrally covers the visible and near-infrared (VNIR), shortwave-infrared (SWIR), and thermal infrared (TIR) regions with 14 spectral bands, 15 to 90m spatial resolution, and 60 km imaging swath. Since operation of the ASTER instrument will be limited by various constraints to a maximum of 16% duty cycle, it is necessary to optimize the operation scenario for efficient data acquisition. The primary limitations on ASTER data collection are the data volume allocated to the instrument in EOS-AM1's memory and in the communications link with TDRSS and ground stations. Flexibility in operations has been requested from the ASTER Science Team in order to obtain as much data as possible while keeping within the allocated data rate. In addition, many possible combinations of the observation modes of the three ASTER subsystems, which can be operated independently with different gain setting for each spectral band, complicate the data acquisition scenario. The ASTER instrument consists of three subsystems which can be operated independently. Combined with multiple gain settings and pointing angles, there are many possible combinations of observation modes, however, several nominal modes have been defined.

There are several types of instrument activity requests, collectively termed "xARs". Approved ASTER investigators can request activities relating to data acquisitions via Data Acquisition Requests (DARs). Local observations are made in response to DARs from individual investigators or individual teams. In cases where the request results in a major load on the instrument resources or where the request can be used to satisfy a large number of users, the request will be from the Science Team in the form of Science Team Acquisition Requests (STAR).

There are three ASTER data types: 1) engineering data that is required to monitor and maintain spacecraft and instrument health and safety, 2) calibration data that is obtained as a part of on-board calibration of the instrument, and 3) science data that is collected to meet the science objectives of the mission. Furthermore, In order to better manage the allocation of ASTER observing resources, three data collection categories for the science data have been defined. 1) Local observation will be made in response to DARs from individual investigators or investigation teams. 2) Regional data sets contain the data necessary for analysis of a large region or a region requiring multi-temporal analysis. 3) The global data set will be used by investigators of every discipline to support their research. This data set will include images of the entire Earth's land surface, using all ASTER spectral bands and stereo.

The ASTER scheduler will choose between different observation alternatives, for each small increment of time in the schedule being generated, in a manner designed to maximize the science return over a time period of a day. The scheduler uses the prioritization function to calculate a priority for each potential observation.